

App Maps: Evaluating Children's iPad Software for 21st Century Literacy Learning

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Abstract:

In this chapter, we introduce a rubric and a map that we developed for comparing early childhood apps on five dimensions of participatory literacies: multiplayer, productive, multimodal, multilinear, and connected. Using exemplar data from our North American classroom studies on children's technology play with iPads, we evaluate and compare four apps to illustrate how the rubric and map can be used to assess each app's potential for developing participatory literacies. A description of each app and an ethnographic data excerpt illustrates how children used each app's features to provide a sampling of the ways that young children actually engaged with the app during classroom play.

App Maps: Evaluating Children's iPad Software for 21st Century Literacy Learning

Three-fourths of U.S. families with young children now have mobile devices such as smartphones or tablets (Rideout, 2013). These accessible digital tools are equipped with touchscreens that respond instantly to a fingertip swipe and are just the right size for young children to handle, carry, and operate. For example, a toddler with a tablet balanced on her lap is learning that the touchscreen is organized by a grid of colorful squarish icons that represent software applications, and importantly with little or no print. Each icon opens an app at the touch of a finger and reading involves more taps...on arrows, “x”, checkmark, trashcan, pencil, plus signs and so on. These icons are not arranged in the orderly rows of print on a page but are scattered along the top, bottom, or corners of the screen. Touchscreens operate with an expanded set of conventions for interactive modes including finger swipes, icon recognition, and voice controls; in other words “*Concepts Beyond Print*” (Wohlwend, in press). Today’s young children are learning printless ways of reading—one finger swipe at a time (Rowsell, 2014). With each tap, our emergent readers are learning interactive and flexible orientations to digital reading: recognizing icons as activators or portals, expecting a finger action to produce a screen change, and persisting when nothing happens, knowing that an area of the screen might contain an invisible icon that may appear when pressed. Furthermore, children understand that screens require new ways of playing, collaborating, and sharing in order to participate in our global digital cultures. Accordingly in order to be truly educational, the tools we select and provide to children—including apps and tablets—must evolve to recognize all that children already know.

However, the educational apps for the early childhood market tend to rely on an outdated and print-centric model of literacy, apparent in the abundance of apps featuring rote memory tasks such as letter-sound matching or word identification (Shuler, 2012). Knobel and Wilber (2009) identified such an approach as “Literacy 1.0”, a print literacy model that grossly underestimates both the young child’s and the technologies’ capabilities for meaningful literacy learning, while “Literacy 2.0” reflects participatory literacies, the new ways we read, write, play, and share ideas using icons, photos, and videos on social media networks. In this chapter, we introduce a way to evaluate the learning potential of apps using a rubric that captures the ways that 21st century learners actually engage in participatory and digital literacies.

Background: New Literacies and Connected Learning

Participatory literacies reflect new ways of thinking about learning to read and write with technology that moves away from the model of an individual reading or typing print on a computer screen. Instead, participatory literacies reflect the principles of social media like Twitter, YouTube, or Facebook or video games and virtual worlds: global participation, multiplayer collaboration, and distributed knowledge. These principles enable participation in vast digital networks through posting, blogging, recording, remixing, uploading, and downloading.

Table 1. Comparing (Print) Literacy and Participatory Literacies

(Print) Literacy	Participatory Literacies
Individual reader/writer	Multiple players/designers
Interpreting and crafting	Negotiating and producing
An original and personally-meaningful narrative text	Multimodal and mutually-engaging interactive contexts
Mediated by peers and teachers in a predictable process	Maintained by groups in fluid multilinear navigation
Located within supportive reading/writing workshops	Connected to participatory cultures, online networks, and maker playshops

Even very young children play and use participatory literacy practices as they engage the world around them, that is, the literacy practices that have the most relevance for young children today are participatory (Wohlwend, 2010). In this chapter, we examine popular apps designed for young children to compare their usefulness for developing five dimensions of participatory literacies:

1. MULTIPLAYER OR DESIGN TEAMS rather than individual
2. PRODUCTIVE, enabling children to produce their own multimedia rather than simply reading or playing a game someone else has made
3. MULTIMODAL rather than print-centric, using multiple modes (sound, touch, image, music) to manage images, video, or animation
4. MULTILINEAR, using hypertext that allows multiple and dynamic storylines
5. CONNECTED, shared on digital networks

The Three Studies

The first study, *Literacy Playshop: Designing Critical Media Literacy Curriculum through Teacher Study Groups* (Wohlwend, Buchholz, Wessel Powell, Coggin, & Husbye, 2013) is in the fifth year of an ongoing study of teacher-designed early childhood media literacy curriculum funded by the Proffitt foundation and Indiana University. The studies are conducted at four sites: three multi-age preschool classrooms for 3- to 5-year-old children in university childcare centers (160 children, 6 teachers) and one kindergarten-first grade multi age classroom for 5-to 7-year-old children in a public charter school (approximately 150 children, 3 teachers). Each Literacy Playshop project began with a year of practitioner inquiry sessions to read research on global children's media and critical literacies, to learn filmmaking techniques, and to develop age-appropriate media literacy curriculum. Wohlwend met twice a month with the teaching teams, video-recording the discussions and their emergence for young children that combines collaboration, play, storytelling, and media production. Researchers visited each classroom two to four times per week during the second half of the year, as teachers implemented their curriculum to video-record classroom play and filmmaking activities and copy children's films and puppet shows. In these Literacy Playshops, children played elaborate stories as they made animation, puppetry, or live-action digital videos with hand-held cameras or tablets. In the following years, Wohlwend and colleagues conducted follow-up research at the sites, visiting at teachers' invitations in subsequent years to document how the teachers revised the Literacy Playshop curriculum over time to better fit their children's interests and school goals. These studies showed that the combination of young children's filmmaking with popular media and digital technologies produces a particularly powerful form of storytelling that sparks invention and collaboration among players. In literacy playshops, even very young children achieved and exceeded academic goals consistent with government accountability standards for literacy, by tapping into individual literacy proficiencies that were grounded in their popular media interests (Wohlwend et al., 2013).

For the second study, a research team (Harwood, Rowsell, Winters, Voloshyn, & Bajovic, 2013) conducted a federally funded research study entitled, *Crayons and iPads: Breaking Boundaries in Young Children's Literacy Meaning Making*, which focused on observations of the naturalistic experiences within five early years classrooms: two community-based early childhood education not-for-profit programs (for children 3-5 years olds), and three full-day kindergarten school-based classrooms. The research team observed, documented and assessed the ways in which young children constructed meaning within these varied social/cultural settings. Researchers visited each classroom bi-monthly for a 7-month period, observing before and after iPads were introduced into each learning context. The team then recorded 120 hours of classroom interactions, 2000 photographs, 200 video recordings, and 500 sample artifacts from children. Seven teacher participants and co-researchers were involved in the observation phase of the project. Driven by a desire to capture the impact and social practices that ensued when iPads entered the early years space, the research team focused on children's everyday practices with traditional early years objects and artifacts such as a sand table, coupled with participatory literacy practices such as playing a sand table app. The researchers analyzed how the introduction of iPads across these different early years contexts shifted the classroom cultures. Researchers observed if there was a shift in children's interactions, positioning, and practices when iPads entered the classroom space and if so, how did the culture, social practices, and space shift when they arrived? What was central to the research was capturing a tacit movement between virtual and physical spaces (Burnett, 2015; Burnett et al., 2014) and what these movements implied in terms of redefining or rethinking meaning making in the early years. To do so, the *Crayons and iPads* Team

documented such aspects of daily classroom life as: classroom cultures; teacher talk; children's meaning-making practices; daily routines; spatial arrangements and their relationships to pedagogical approaches.

For the third research study, *Tutoring by Design*, Rowsell, Colquhoun, Maues (in progress) supervised a tutoring program every evening during the school year where teacher education students tutor children, adolescents and teenagers in the community in literacy skills. One evening a week over nine months, the research team offered iPad tutoring sessions with a focus on participatory literacies pedagogy featuring multimodal activities; multiplayer practices; productive work that is multilinear and connected. Focusing on different apps, games, and iBooks (Rowsell, 2014), tutees worked closely with tutors on digital texts that they use significantly outside of school and documented practices, problem-solving, thinking processes enacted over the course of tutoring sessions. Through fieldnotes, Rowsell's researcher team noted the particular nature of thinking through iPads, but also visualized the process as seen in Figure 1. Data collection comprised observational fieldnotes taken during tutoring sessions whereby Rowsell, Colquhoun and Maues separately sat beside tutors as they worked with tutees over the course of an hour; interviews with tutees after the study; visual footage in the form of photographs and filmed footage; and, a research blog to which all of the tutors and researchers contributed.



Figure 1. Visualizing thinking with iPads

In Figure 1, we have used color-coded squares to mark an hour of tutoring work in what we think of as multimodal logic or modal learning (Rowsell, 2013) which connects strongly with participatory literacies. Starting in the green square, Peter and Calvin read about how swords are made on a website, then Calvin played with a game app called *Minecraft* while Peter researched an app called *Mythology* (yellow square); then in the blue and purple squares, Calvin and Peter read the *Mythology* app and concluded the hour in the blue box with Calvin and Peter working on a writing piece about *Minecraft* and mythology. This figure illustrates how *Tutoring by Design* works. Researchers involved in the study focused on visualizing practices and interpreting haptic play to develop a language to describe

competencies and thinking processes in participatory literacies. As well, tutors and researchers contributed to a blog to share and reflect on the project.

Literacy Apps and App Maps

Our intent in the chapter has been to build on studies of app use by young children (Chiong & Shuler, 2010; Shuler, 2012) to recalibrate app evaluation tools for participatory literacies. In this section, we introduce a rubric and a map for comparing early childhood apps according to these five elements of participatory literacies (Table 2). In the following sections, we feature four apps used in three classroom studies of early childhood technology to illustrate how the rubric and map can be used to assess the software's potential for participatory literacies. For each app, an app description and an excerpt of classroom play provide a sample of the ways that young children actually engaged with the four educational apps. We analyze these anecdotes according to the rubric and then compare the extent that each app supported key elements of participatory literacies: multimodal, multiplayer, productive, multilinear, or connected. (We note here that apps change frequently with increased capabilities and features added or dropped without notice, so that the app maps and rubric scores reflect the data we gathered a year or more prior to publication, at the time each study was conducted).

Table 2. *Participatory Literacies Rubric and Benchmarks*

	High	Medium	Low
Multiplayer	Accommodates 3 or more players	Accommodates 2 players	Accommodates 1 player
Productive	Enables creative original content additions rather than pre-set components (e.g., make or import own content)	Enables some original content; choices among pre-set images or texts (e.g., range of avatar clothing and features, original story action)	Limited original content, pre-set personalization element (e.g., insert 1 element to personalize; minimal choices for avatar design)
Multimodal	Enhances meaning through combinations of 4 or more modes: music, image, sound effects, animation; inspires play with real world materials	Enables manipulation and combinations of several modes: image, paint, movement (animation), speech, music	Primarily print word processing tools, supplemented with stamping or basic paint tools
Multilinear	Open-ended storytelling with many tangents (e.g., hypertext, portals as in videogames)	Enables an alternate ending; supports revisions to insert additional events	Enables a single storyline in an unvarying sequence that proceeds from beginning to end

Connected	Saving and facilitated sharing on videosharing sites (e.g., youtube)	Opportunities to export films for saving and external emailing or posting	Internal network sharing only or proprietary formats that require website registration to view
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App Examples and Literacy Anecdotes

Toontastic

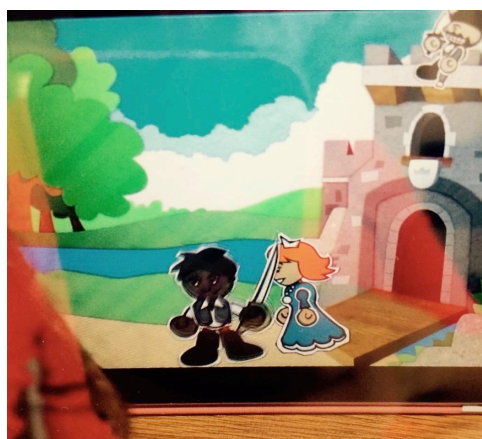


Figure 2. Alice creating a love story

To offer an example of how participatory literacies can be enacted in the app *Toontastic*, Rowsell provides excerpts of data from the *Tutoring by Design* study. As discussed earlier, tutees worked with tutors over the course of an hour and focused on apps as the mainstay of the tutoring material. Many of the participants liked *Toontastic* because they could play with movie tropes and the concept of memes (Knobel & Lankshear, 2007). For instance, Alice, seen in Figure 2, created a love story about a pirate and a young maiden who fall in love, and then the maiden is kidnapped by an evil green cow who puts her in a dungeon in a castle until her pirate love rescues her.

The format of *Toontastic* is fairly constrained by the story arc that follows consecutively: an introduction, conflict, resolution, and conclusion. Players have to stay within this story structure and there are a series of different templates to choose from to construct a given story, or, there is the option to create your own story template. As well, players can add music and animations if desired. What was interesting about different readers was how they strayed from typical storylines and infused their own intertextual elements. For instance, in Alice's short love story, she changed the colour of the evil cow. In the first scene, the cow was brown in line with the template, but in the next three scenes, Alice changed the colour palette and made the cow green and the maiden's dress pink. As well, rather than the pirate being a powerful hero who saves the day, instead he deferred to the maiden on what to do once he freed her from the castle. Finally, Alice injected bits of popular culture such as the line that she gave the pirate when he confronted the cow: "Hey cow, say hello to my little friend" which references the iconic line from *Scarface* when Al Pacino faces a group of drug runners with a machine gun and uses this same line. In this way, the productive elements of app play with *Toontastic* emerged from including mimesis or memes into storylines to making the content more edgy, interesting, and connected to other texts.

In Wohlwend's *Literacy Playshop* study, easily recognizable character sets and scenes (e.g., pirates, sharks, and ships, astronauts and spaceships; witches and cauldrons) also inspired memes and facilitated collaboration among players, as players could quickly agree on simple story actions. Children also frequently selected the blank canvas and paint palette to create their own characters and backdrops, although some children became so engrossed in painting they spent far less time on using the character in the animation sequence.

In the *Toontastic* App Map (Figure 3) below, the highest scores are for multimodal potential and productive capacity as the app enables many ways for players to create original content. Multiplayer play is somewhat enabled as two children can collaborate on a story but too many fingers caused freeze-ups. Most constraining is the connectivity which limits video-sharing to the in-app Toontube network, and the multilinearity of a single, sequential standardized story arc.

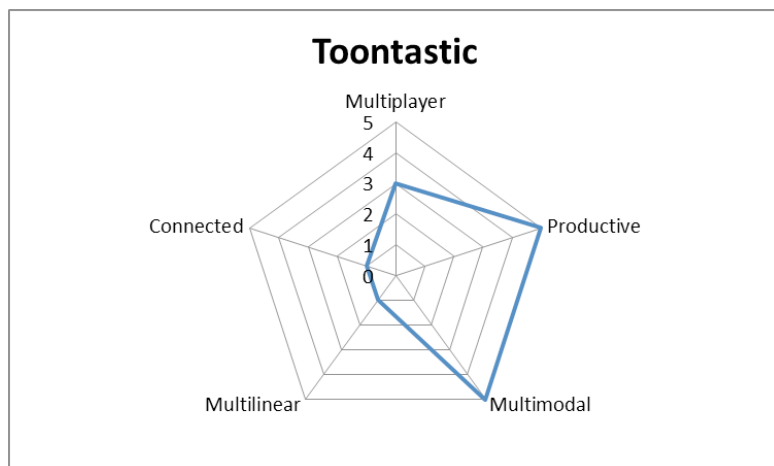
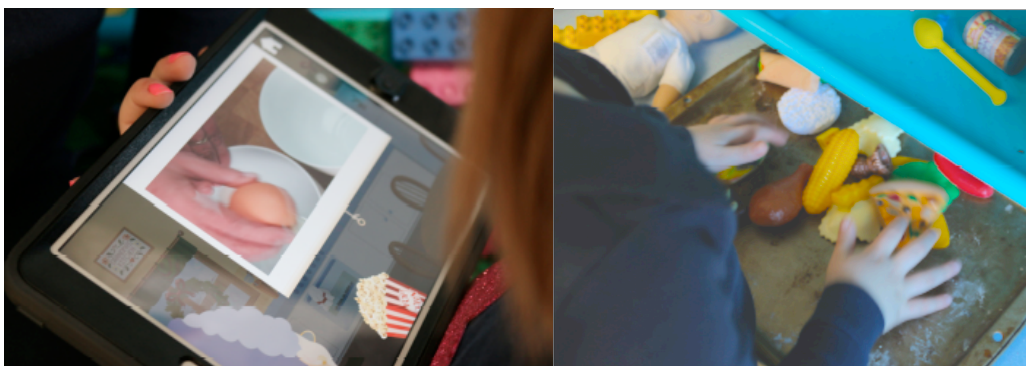


Figure 3. *Toontastic* App Map

Grandma's Kitchen



Figures 4 and 5: Parallel Play in Virtual and Physical Worlds

During Rowsell's *Crayons and iPads* project, researchers documented apps that children played alongside any parallels with similar physical/material worlds, within each context. A popular app was *Grandma's Kitchen*, which is an app where children can cook and bake with an animated grandma character. There were several instances when researchers observed how children moved across a digitized version of cooking and baking practices and emulated these same practices in their kitchen space in the classroom site:

In the house dramatic play center, 4 kindergarten age children were playing a type of cooking game. They found the *Grandma's Kitchen* app (on the tablet) and started playing it too. They were watching the videos in the app and then making the food in

their pretend play (that was pictured in the app). For example, the video showed cracking eggs and the children were pretending to break eggs for baking. When the app said, “give Grandma a kiss”, one of the children actually kissed the tablet! As the children played this ‘baking game’ they drifted back and forth between the app and concrete toys (see Figures 4 and 5). Children would take information from the app and trial that knowledge with concrete toys. Similarly, play themes that had started within the concrete world (e.g., baking a cake) would be enhanced and extended using the app’s content (e.g., using measuring spoons for ingredients). The children then blended this converged experience and knowledge to write a menu with a stylus pen on the tablet. Could the children have achieved their play aims with either the concrete toys or the tablet?

In relation to our rubric and benchmark, children’s naturalized movements from *Grandma’s Kitchen* had the highest scores for being multilinear and multimodal. Children displayed tremendous flexibility moving across physical and virtual spaces and, equally, they made meaning fluidly and with a fluency of thought and creativity across a variety of modes (virtual and non-virtual modes). Where children showed less potential and productivity in terms of the app was in the area of connectedness – there was very little filming and sharing of events. Rather, children were focused on tasks at-hand and fulfilling a set of practices (fig. 6).

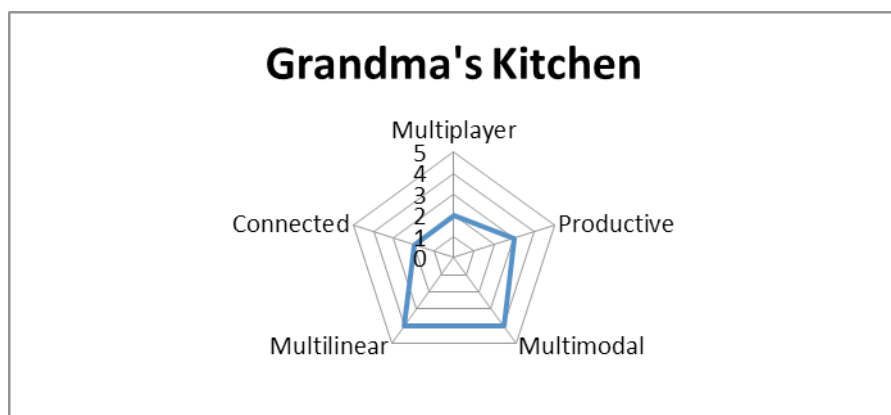


Figure 6. *Grandma’s Kitchen* App Map

PuppetPals

In the *Literacy Playshop* project, researchers documented classroom activity and child-made videos as children used several iPad apps to create animated stories. In the app *PuppetPals* (Polished Play), children could choose characters, a setting, and then animate a story in real-time by manually moving characters onscreen with their fingertips while simultaneously narrating the story (or speaking dialogue), captured by the iPad’s internal microphone. Instant playback was crucial in helping preschool children see what was actually onscreen after filming, including the visual, movement, and the audio modes. A few of the onscreen actions are labeled and require word identification (e.g., the “back” and “next” icons for navigating between screens); other elements use icons (arrows, red button for signaling the beginning and ending of the recording process). Other navigation tools are not labeled and controlled by touch and taps (e.g., tracing around photos to create character cutouts; swiping to scroll through backdrops and characters, dragging and dropping to select characters; pinching and spreading

fingers to resize characters and objects; and moving characters to enter, enact, and exit the animation sequence by drag and drop).

In the combined kindergarten/grade one classroom, a group of six- and seven-year-old children huddled around the iPad at one end of a low table. The girls were dragging characters on and off stage in the *PuppetPals* app, using the free basic set of fairy tale characters and castle backdrop. Six hands jockeyed for room on the small rectangular screen, squeezing in to drag, drop, resize, or rotate the cutouts of a princess, knight, dragon, chipmunk, and crow. Suddenly, Allie dragged the princess character rapidly back and forth across the castle, “Get your booty out of here!” Sierra quickly decided this demand was directed toward her chipmunk character and resized its body, creating a giant chipmunk to challenge the attacking princess. Giggling, the girls begin a fight scene by moving and rotating their characters on and off stage, their moves punctuated by growls and shrieks.

While limiting children’s ability to create new plots and original content, the preset cartoon character sets did afford easy recognition of familiar roles and storylines (e.g., princess, dragon, castle) which enhanced multiplayer collaboration as children could quickly join a play scenario in progress. As in Allie and Sierra’s play, the app’s inclusion of seemingly unrelated characters like the chipmunk and crow opened new possibilities for storylines that the children found humorous and engaging. Additional sets were available for purchase and a “director’s pass” upgrade in the program enabled children to use the iPad camera to import photos and trace a cutout feature that allowed children to create their own puppets or to create custom backdrops. Children spent time gathering toys and classroom materials to take pictures to add to their films. They also took photos of one another to put a friend in the story. Unlike *Toontastic*, there was no paint program to enable modifying the photo or to draw original characters.

The *PuppetPals* App Map (Figure 7) below reflects the high potential for multiplayer collaboration as several children could manipulate characters, which was limited only by the size of the tablet touchscreen, as well as high production capacity for original content that inspired children to photograph classroom toys and import them into their films. Medium levels of connectivity reflect the fact that films could be saved for sharing on external sites. Multimodal manipulation was limited to animation and audio recording as there are no in-app drawing, paint, or music tools. The lowest score is multilinearity: the app’s simple design immediately overwrites any unsaved recording; although it does not impose a template for a linear story arc, it also does not enable multiple recordings or revisions.

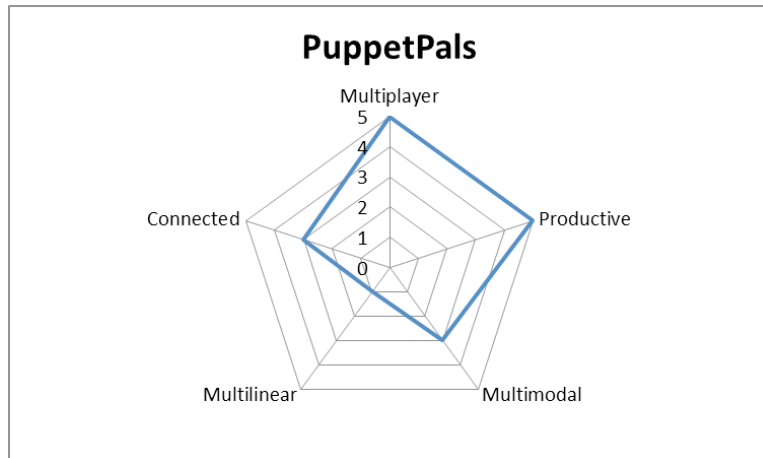


Figure 7. *PuppetPals* App Map

Jib Jab Jr. Books

In contrast to the puppetry animation apps, an ebook app had little staying power with children in the *Literacy Playshop* project. They lost interest relatively quickly in the *Jib Jab Jr. Books* (2011) personalized ebook program in which a child can take a self-portrait with the iPad camera, trace around one's head, and import the cut-out to paste it on a cartoon body to create a cartoon chef. In the highly-animated musical story book, the child can view the pages as the personalized chef character humorously makes a pizza across the course of the book. Amy, one child who worked with the app on several days, was content to tap on the screen to page through the book, repeatedly showing it to friends at the table. However, her interest faded after two days as the app did not allow her to vary the text content or the sequence of events or to add speech or music. The book could not be shared online and could only be viewed on an iPad with the app.

The JibJab App Map (Figure 8) below shows an overall low score for digital literacies. The end product of a personalized ebook was quite polished but with little possibility for multiplayer collaboration, original content, multimodal manipulation, storyline flexibility, or sharing among players.

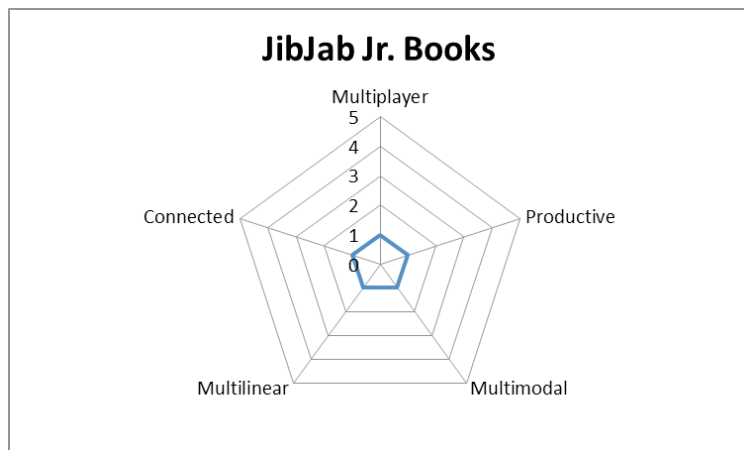


Figure 8. JibJab Jr. Books App Map

Comparison of Apps

A comparison of all four apps reveals that the programs varied widely in their capacity for supporting participatory literacies, but in general, there were lower levels for connectivity and multilinearity, and higher levels for productivity, multiplayer collaboration, and multimodal creativity. Some of the limitations appear technological and related to design features while others appear discursive and related to ideological beliefs about children's abilities or the nature of literacy. For example, low connectivity seems related to safety concerns for limiting children's contact with online others and proprietary interests for generating more users through internal sharing networks. Multi-linearity is enabled by more open-ended apps and user interfaces that provide html navigation but limited by structured story templates or video production that results in a linear film. Productivity appears to be one of the most easily enabled dimensions through a recording option that makes use of the tablet's internal camera and microphone. Higher levels of multimodality require more design features, such as paint or photography programs or pre-loaded libraries of music and sound effect options. Multiplayer collaboration is sometimes limited by the size of the tablet touchscreens or by user interfaces that either limit or become overwhelmed by multiple simultaneous user touches.

Table 3. Comparing Apps across Five Dimensions of Participatory Literacies

Digital Storytelling Apps	Multi-player	Productive	Multi-modal	Multi-linear	Connected
<i>JibJab</i> Personalized e-book	LOW	LOW	LOW	LOW	LOW
<i>PuppetPals*</i> Cartoon or Photo Animation	HIGH	HIGH	MEDIUM	LOW	MEDIUM
<i>Toontastic*</i> Cartoon or Photo Animation	MEDIUM	HIGH	HIGH	LOW	LOW
<i>Grandma's Kitchen</i> Producing or making things and interaction with avatars	MEDIUM	MEDIUM	MEDIUM/HIGH	HIGH	LOW

**basic levels of the free version of the app limits original content to lowest level; purchase of upgrade required to enable original content*

Discussion: Apps and Participatory Literacies

Comparing four popular apps makes clear the disparate adoptions of participatory literacies and competencies. There is an open, participatory, and design feel to apps that align with new digital logics. Regarding the logic of participatory literacies, not all apps offered the capacity to make meaning across a

variety of modes with peers in an unpredictable, multilinear way, and then to document these practices in some way such as filming a story or remixing familiar and novel characters to create an original film that can be shared with distant others. Instead, apps featured in the chapter exhibited one or two of each benchmarks. There is a skills delivery focus in some apps, or an ‘old wine in new bottles’ (Lankshear & Knobel, 2003) feel that, in our experience, children see through right away. Given the popularity of the four apps featured in the chapter, it has been telling to interpret how much apps actually align with new ways of thinking and communicating and these comparisons point to larger issues and implications in terms of where we are presently in understanding and realizing participatory literacies within everyday technologies. In some ways, we are still constrained by what we think of as autonomous views of literacy learning.

There is a grounded mobility from the physical to the virtual across all of the apps that we analyzed. Burnett’s research has examined how children move across physical and virtual spaces and manifest immaterial literacies (Burnett, 2015) when they do so. Important to the concept of participatory literacies, this productivity and connectedness between material and virtual worlds invites multimodal sense-making as children use an ensemble of resources through their imaginative engagements. Previous notions of literacy practices in text-oriented paradigms maintain a “boundedness” to meaning-making. For example, within the *Crayons and iPads* research not only did children play across virtual and physical worlds, they also would produce texts as a result of this im/material movement and mobility. The research team observed that when children played the *Grandma’s Kitchen* app, they would experiment with actions that they completed in the app such as cracking an egg, then they would apply that knowledge to the physical toy egg in the pretend kitchen. Extending this physical play, they would move to a story and drawing centre and sketch out stories from properties within the virtual and physical play – being with Grandma or a family member and baking something. To complete this productive work, they would use a stylus pen on the iPad or crayons and paper. The “converged” world of the children’s play across these contexts offered greater and more dynamic opportunities to combine and develop participatory literacies.

Building on the work of Brian Street and his contention that policy has a tendency to frame literacy as an autonomous skill that we acquire from formalized, school-based approaches to literacy learning and that we cognitively develop and carry with us (Street, 1984), we similarly posit that many commercial apps still work within a print-centric, autonomous model of literacy that exists within older models of literacy learning. That is, such apps need to teach a skill, be used in a solitary way, and follow a linear path. For instance, *Toontastic* does not allow players to stray from conventional storylines and trajectories from an introduction, denouement, conflict, resolution, and conclusion and it is not a format that is conducive to be filmed, converged, and shared with a peer group. Within the set structures of these apps, there is not the openness that allows for problem-solving and experimentation. For example, *JibJab* does not include a multiplayer platform, does not invite productivity and sharing, and there is not much evidence of multimodality. In other words, print-bound apps, although at times engaging, do not invite and foster the kinds of practices and thinking processes participatory literacies make possible.

Our early thinking about a lack of alignment between apps and participatory literacies is that there is a greater need for an ideological approach to app literacies. Thinking about Street’s writing about ideological models of literacy (Street, 1995), it starts from a belief that knowledge is socially constructed and epistemological framings of texts are socially-constructed and mediated. Relating Street’s differentiation between autonomous and ideological approaches to literacy, apps that encourage more of an autonomous model come from one dominant assumption, acquiring predominantly language skills

through a fun platform that encourage some play, but ultimately with a pedagogic end and often played in a solitary way. In contrast, apps that encourage more of an ideological model provide openness to its design, with potential for multiple players' participation and productive play where you can make your own content and use a variety of modes to do so.

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